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Nutrient-Induced Growth of Coliform and HPC Bacteria in Drinking-Water Pipes

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ABSTRACT

We conducted a study on a model drinking water distribution system to evaluate the impact of nutrient in the form of sodium acetate on the growth and survival of coliform and heterotrophic plate count (HPC) bacteria for a maximum of 21 days residence time of water in pipes. Our results show that, besides the nutrient added and the absence of any additional source of contamination and additional supply of nutrient, there was significant growth of the above mentioned bacteria in the pipes and bottles for a couple of days, after which the bacterial population began to decrease. The results indicate that the bacteria used the nutrient to grow and multiply until the nutrient was totally consumed and became depleted in the bulk water phase, after which the bacterial population reached a near stationary level and subsequently declined. This suggests the death of some of the bacteria and their dead cells were used by other bacteria for growth and survival. Using a detection limit of 3.3 CFU/100 mL for the coliforms, the study shows that after sometime, no bacteria were found in the water phase of the pipe, however, the biofilm in the pipes still harbored some of the bacteria. The results have revealed that the bacteria also have the tendency to move from the water phase to the biofilm since the latter provides a more suitable environment for bacteria to thrive on and grow, thus prolonging their survival in the system.

KEYWORDS

Coliform; HPC Bacteria; Nutrient; Drinking-Water Pipes; Biofilm; Bacterial Growth

Cite this paper

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